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Experimental Studies in the Training of Originality

By

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EXPERIMENTAL STUDIES IN THE TRAINING OF ORIGINALITY[1]

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A BASIC difficulty in attempting to facilitate original thinking is that it may not occur at all or at such infrequent intervals that reinforcements cannot be administered with sufficient frequency to effect an increase in such behavior. Thus, a fundamental problem in the training of originality is to devise methods for increasing its occurrence in the first place, thereby permitting the operation of reinforcement. We are assuming that originality can be learned and that the same principles of conditioning hold as in other forms of operant behavior. Some of the problems attendant upon this assumption have been discussed elsewhere (Maltzman, 1960). For our present purposes we need indicate only that by originality, or original thinking, we mean behavior that occurs relatively infrequently, is uncommon under given conditions, and is relevant to those conditions. In order, then, to facilitate the occurrence of original behavior, techniques must be devised for evoking many uncommon responses. Such training may then produce a disposition to give uncommon responses in other situations.

One procedure, used by Maltzman, Bogartz, and Breger (1958) is to repeatedly evoke different associations to the same stimulus words in a free association situation. This procedure prompts the subject to emit responses relatively low in the response hierarchy elicitable by each stimulus. They found that subjects receiving this training with intermittent reinforcement of uncommon responses were significantly more original on a new list of words than subjects without this training. A second experimental group which did not receive verbal reinforcement approached significance in comparison with the control group. When instructions to be original were added to the experimental and control treatments they showed a marked increase in the originality of their associations, and both experimental groups were now significantly more original than the control group. The Unusual Uses Test of originality devised by Guilford and his associates (1950) was administered following the free association test. Equivocal evidence for transfer of the association training effects to this situation was obtained in the form of a significant triple order interaction.

The essential features of the procedure responsible for the facilitation of original responses to new stimuli, however, cannot be determined from that study. The purpose of the present series of experiments, in part, is to determine what those relevant features are.

EXPERIMENT I

It may be that the important characteristic of the procedure employed by Maltzman, Bogartz, and Breger (1958) is not evocation of responses relatively low in the hierarchy of each stimulus word, as was assumed, but simply the production of many different responses. The purpose of this first experiment, therefore, was to determine whether facilitation of uncommon responses to new stimuli would occur when different responses were evoked by the presentation of different stimuli rather than by repetition of the same stimuli. Two different lists of stimulus words were employed

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for this purpose. One list consisted of relatively common and the other relatively uncommon words, in order to determine whether the frequency of usage of the words would have a differential effect upon the uncommonness of test responses. Another control group not employed in the previous study (Maltzman, Bogartz, & Breger, 1958) was added to this experiment. This group responded in the same fashion to repeated presentations of a given stimulus word. Such a condition would enable us to determine whether the number of responses per se, or the number of different responses, is the relevant variable influencing test performance.

Method

Subjects. The subjects (*S*s) were 292 students drawn from introductory psychology classes.

Stimulus materials. The stimulus words used in the initial list and the test list for all groups were selected from the norms obtained by Wilson (1942), and are the same as those used in a previous study (Maltzman, Bogartz, & Breger, 1958). Evocation of a relatively small number of different responses in a free association situation was the criterion for the selection of these stimulus words. The different training words presented to two of the groups following the initial list were selected from the Thorndike-Lorge count (1944). The list of relatively common words were chosen from among the 500 most frequently occurring words in the count. The list of relatively uncommon words were selected from words occurring not more than 6 times per 1,000,000. Guilford's Unusual Uses Test (1950) was administered after the completion of the free association test list.

Procedure. The *S*s were treated in identical fashion on the initial presentation of the free association training list, the first 25 stimulus words for all the groups. At the start of the experiment the *S*s received the usual free association instructions to respond as quickly as possible with the first word that came to mind.

After completion of the initial 25-word training list one control group (C) was given the test list of 25 new stimulus words. The previous instructions were repeated before presentation of the test list, as they were for all the other groups. A second control group (C_R) received five additional presentations of the same training list with instructions to try to give the same response to a given stimulus word each time. They received the test list following the last repetition of the initial training list.

Two experimental groups received a single presentation of the initial 25-word training list followed immediately by 125 different words. One group (X_L) received a list of words with a low frequency count, while the other group (X_H) received words with a high count. They were given the test list following the completion of the entire training list.

After completion of the training list a third experimental group (X) received five additional presentations of the list with instructions to respond as quickly as possible to each word, but to give a different response than the one used before. The test list was administered following the last repetition of the training list.

All groups received the Unusual Uses Test immediately after the completion of the free association test list.

The experiment was conducted in group form. Stimulus words for the free association training and test were read aloud by *E*, and *S* recorded his responses in a booklet provided. Each page of the booklet had 25 numbered blank spaces for his responses. A stimulus word was presented every 5 sec. during the initial training list and the test list for all groups. The additional training words presented groups X_H and X_L were presented at the same rate. Repetitions of the initial training list words for groups X and C_R were presented at 10 sec. intervals.

Results

The frequency with which the different responses occurred to each stimulus word was determined for the free association training and test lists. *S*s' responses were then scored on the basis of the obtained frequencies, and each *S* was assigned an originality score which was the mean frequency of his responses. A low score therefore represents high originality. A few *S*s failed to respond to a stimulus word or recorded an illegible response, but no *S* gave less than 24 readable responses. Their score was based on the number of legible responses recorded.

Table 1 shows the mean originality scores obtained by the various groups on the first presentation of the training list, the pretest. A simple analysis of variance showed that they did not differ significantly prior to the introduction of the different treatments ($F = 2.22$; $df = 4,287$; $P > .05$). Homogeneity of variance was indicated by the Hartley test.

Table 2 shows the mean originality scores obtained by the various groups on the free association test list. An analysis of covariance of the free association test scores was

TABLE 1

MEAN PRETEST FREE ASSOCIATION ORIGINALITY SCORES IN EXP. I

Cond.	*N*	Mean	*SD*
C	64	91.69	19.74
C_R	62	92.70	16.42
X	60	86.39	25.89
X_H	60	97.06	19.35
X_L	46	95.89	20.64

planned in order to increase the precision of the experiment. However, a test of the homogeneity of regression of the test on the training scores indicated that this assumption of the analysis could not be met ($P < .005$).

A simple analysis of variance of performance on the free association originality test was therefore conducted. An F of 14.95 was obtained ($df = 4,287$; $P < .001$). The results of t tests showed that the two control groups did not differ significantly from each other and the three experimental groups did not differ significantly. However, each of the three experimental groups was significantly more original than each of the control groups, $P < .001$.

Originality scores for performance on the Unusual Uses Test were obtained for each *S* by a procedure somewhat similar to the one employed for the free association test. The frequency with which different uses occurred for each of the six different objects mentioned in the test was first determined. In the previous study by Maltzman, Bogartz, and Breger (1958) an originality score was obtained for each *S* by counting the number of responses he gave to each test item that occurred less than 10% of the time in the obtained sample. This procedure was not feasible in the present study which employed more than twice the number of *S*s, since unique responses typically comprised more than 10% of the responses to each item. The originality score for each *S* therefore was taken as his total number of unique responses. Any response was defined as unique if it occurred only once in the sample to a given test item. A second score obtained for each *S* was his total number of nonunique or common responses. This may be taken as a measure of fluency.

Table 3 shows the mean number of unique responses obtained by the various groups on the Unusual Uses Test. The results from one *S* in Group C_R were discarded, because he incorrectly recorded his uses in the free association test booklet rather than the booklet provided for the Unusual Uses Test. Since Hartley's test indicated that the variances of these scores were heterogeneous ($P < .01$) and the distributions were highly skewed, it was decided to adopt the .01 level for rejection of the null hypothesis. An analysis of covariance was not conducted because of the absence of a significant correlation between unique responses and originality on the free association pretest.

A simple analysis of variance of the originality measure obtained from the Unusual Uses Test gave an F of 18.74 ($df = 4, 286$; $P < .001$). Since the variances were significantly different, half the appropriate degrees of freedom were used in the t tests of the differences between groups. Results of these tests showed that Group X gave significantly more unique responses

TABLE 2

MEAN ORIGINALITY SCORES ON FREE ASSOCIATION TEST IN EXP. I

Cond.	Mean	*SD*
C	76.38	23.18
C_R	70.90	20.99
X	54.49	18.42
X_H	53.40	24.57
X_L	56.44	18.64

TABLE 3

MEAN NUMBER OF UNIQUE USES IN EXP. I

Cond.	Mean	*SD*
C	2.58	2.30
C_R	1.03	1.06
X	4.75	3.54
X_H	2.27	2.08
X_L	2.72	2.36

TABLE 4

MEAN NUMBER OF COMMON USES IN EXP. I

Cond.	Mean	*SD*
C	14.44	4.84
C_R	14.59	4.58
X	15.65	5.09
X_H	15.42	4.18
X_L	15.62	4.34

than any of the other groups, $P < .001$. Groups X_H, X_L, and C did not differ significantly. However, Groups C and X_L were significantly more original than Group C_R at the .001 level. Group X_H was significantly more original that C_R at the .01 level. A rank order analysis of variance yielded comparable results ($H = 52.00$; $df = 4$; $P < .001$).

Table 4 shows the mean number of nonunique or common responses obtained by the different groups on the Unusual Uses Test. Hartley's test indicated that the variances were homogeneous. A simple analysis of variance yielded an F of .92, indicating that the groups did not differ significantly in terms of their fluency of common responses on the Unusual Uses Test. Analysis of covariance was again contraindicated by the absence of a significant correlation between frequency of common uses and originality on the free association pretest.

A basic assumption in the use of the training procedure employed with Group X is that it would increase the uncommonness of the responses to the training words. Fig. 1 shows the mean percentage of unique responses occurring on successive repetitions of the training list. It was necessary to employ the percentage of unique responses rather than the mean or median weighted frequency scores, because of the highly skewed distributions of scores obtained for the 25 training words. By the third repetition over half the responses of the average S were unique. It is clear from Fig. 1 that the training method employed with Group X had the desired effect of inducing an increase in the uncommonness of the responses emitted.

Group C and Group X in the present experiment are similar to conditions employed in the study by Maltzman, Bogartz, and Breger (1958). In the latter experiment the difference in originality between these two groups only approached significance on the free association test, but was significant when combined with verbal reinforcement or instructions to be original. In the present experiment Group X showed a highly significant increase in free association originality in the absence of verbal reinforcement or differential instructions to be original. In the previous experiment only equivocal evidence of facilitation on the Unusual Uses Test was obtained. Here, the training administered Group X in the free association situation produced a highly significant facilitation of originality on the Unusual Uses Test.

The different results obtained in the two experiments may only be due to the increase in the size of the sample in the present experiment. However, it is possible that the change from an individual to a group experiment also contributed to the difference in results. Conducting a free association experiment in group form grants a degree of anonymity to S's responses which is not the case when he is run on an individual

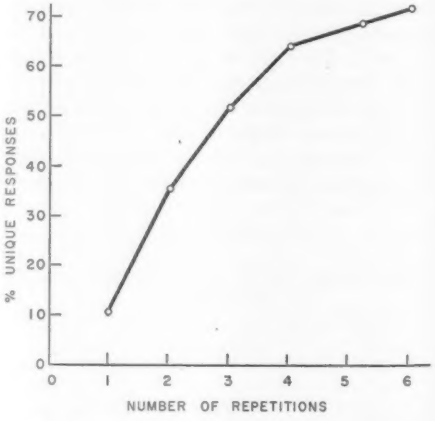

FIG. 1. Mean percentage of unique responses obtained by Group X with free association training in Exp. I.

basis. In the group experiment there also are necessarily more different cues present that are potentially the occasion for many responses less likely to occur when *S* is alone with *E* in a bare room. Both of these characteristics may have contributed to the appearance of a training effect in this experiment of a greater magnitude than the one reported in the earlier study (Maltzman, Bogartz, & Breger, 1958). In any case the magnitude of the training effect obtained in this study is consistent with the results of the subsequent experiments reported here.

Groups X_H and X_L were employed in order to determine whether evoking many different responses would produce the same effect on test performance as the training provided Group X. The assumption was that the occurrence of any given response increases the disposition of responses associated with it to occur. Evidence of such an effect has been reported by Judson and Cofer (1956) and by Judson, Cofer, and Gelfand (1956). Providing for the occurrence of many different responses during free association training should therefore increase the reaction potential of many more different responses on the test list as compared with the control groups. That an effect of this sort may be operating is suggested by the results of the free association test where the three experimental groups do not differ significantly, but are signficantly superior to the control groups.

However, the results of the Unusual Uses Test in terms of originality scores indicates that the training administered Group X involves more than the arousal of many intraverbal associations. On this test, Group X gave significantly more unique responses than Groups X_H and X_L as well as the two control groups. These results indicate that the procedure of repeated evocation of different responses to the same stimulus words produces a more general disposition to produce uncommon responses than the procedure of evoking different responses to different stimuli. The effect of this training, furthermore, was restricted to increasing the number of uncommon uses. There were no significant differences among the groups in terms of their fluency of common responses.

The significantly poorer performance on the free association originality test of Group C_R than the three experimental groups indicates that the increased originality of the experimental groups on this test cannot be attributed to the number of responses evoked per se or to habituation factors. The three experimental groups and Group C_R emitted the same number of responses during training. The difference obtained must be due to the uncommonness of responses per se emitted by the experimental groups or the uncommonness of responses emitted to the given stimulus words.

The fact that Group C_R gave significantly fewer unique uses than Group C indicates that the training in the free association situation of repeatedly evoking the same response to a given stimulus interferes with the tendency to give uncommon uses. To some extent, the repeated occurrence of common responses to the same stimuli increases the tendency to emit common responses in other situations, just as the repeated occurrence of uncommon responses to the same stimuli increases the disposition for original behavior in other situations.

Experiment II

The purpose of this next experiment was to further explore possible relevant variables and alternative methods of facilitating originality. Two groups of *S*s were exposed to uncommon associations which they simply read, in order to determine whether emission of uncommon responses by *S* is a necessary condition of the originality training procedure. In an attempt to explore the extent to which the method of facilitating originality is peculiar to the training materials employed, a group of *S*s was given repeated presentations of items from the Unusual Uses Test and tested with the free association materials. Conditions X and C of the previous experiment, which we shall hereafter call the standard experimental training and control conditions, were also employed in this experiment.

Method

Subjects. The *S*s were 251 students drawn from introductory psychology classes.

Stimulus materials. The stimulus words used in the initial training and subsequent test lists are the same as those in Experiment I. However, their function was reversed in the present experiment. The list previously employed as the training list was used as the test list in this experiment, and the test list in the previous experiment was used as the training list. Guilford's Unusual Uses Test was administered after the completion of the free association test list to all groups except X_2.

Procedure. All *S*s were presented the initial training list and the final test list of stimulus words in the same manner, including the usual free association instructions to respond as quickly as possible with the first word that came to mind.

The standard control group (C) received only a single presentation of the training list followed by the test list of words. The standard experimental condition (X_1), as in the previous study, received five additional presentations of the training list with instructions to respond as quickly as possible, but to give a different response than the one used before to each stimulus.

A second experimental group (X_2) was also asked to respond differently to repeated presentations. However, the stimuli employed were the six items from the Unusual Uses Test. The *S*s were instructed to write a different use following the oral presentations of each item. Five repetitions of the items were administered. A third experimental group (X_3) was presented with a booklet of 125 pairs of items. The *S*s in this condition were instructed to underline the member of each pair which goes more readily with the stimulus word orally presented to them. The stimulus words were five repetitions of the training list. Response pairs were unique responses to these words culled from the results of Exp. I.

The final experimental group, X_4, received the same response pairs as Group X_3, but without the preceding stimulus words. These *S*s were instructed to underline the member of each pair that they thought to be more familiar.

Stimulus words for the free association training and test lists were read aloud by *E*, and *S* recorded his responses in a booklet provided by *E*. The Unusual Uses Test was presented in written form to all groups except Group X_2. Stimulus words were presented every 5 sec. during the initial free association training and test. Repeated presentations of the stimuli for originality training occurred at 10 sec. intervals. Fifteen sec. were permitted for the response to each unusual uses training item in Group X_2.

Results

Frequency distributions of the responses to each of the training words in Exp. I were employed as norms for scoring the responses to these words which were employed as the test list in the present study.

TABLE 5

MEAN PRETEST FREE ASSOCIATION ORIGINALITY SCORES IN EXP. II

Cond.	*N*	Mean	*SD*
X_1	64	87.72	20.02
X_2	46	83.56	21.37
X_3	48	87.85	18.36
X_4	39	85.66	18.98
C	54	83.48	23.18

The frequency with which the different responses occurred to each of the training words in the present experiment was determined, and *S*s' responses were scored on the basis of these frequencies.

Table 5 shows the mean originality scores obtained by the various groups on the first presentation of the training list. A simple analysis of variance indicated that the groups did not differ significantly prior to the introduction of the experimental treatments ($F = .55$). Homogeneity of variance was indicated by the Hartley test.

Table 6 shows the mean originality scores obtained by the various groups on the free association test. Appropriate tests indicated that the variances of the test scores were homogeneous as well as the regression of test scores on training scores. The regression of the test scores on the initial training scores was .69.

A simple analysis of covariance was therefore conducted in which the originality test scores were adjusted for initial differences on the training list. An F of 31.86 was obtained ($df = 4, 245$; $P < .001$). The results of t tests indicated that Group X_1

TABLE 6

UNADJUSTED AND ADJUSTED (MEAN') FREE ASSOCIATION TEST ORIGINALITY SCORES IN EXP. II

Cond.	Mean	*SD*	Mean'
X_1	55.09	20.44	53.73
X_2	80.02	25.88	81.54
X_3	87.82	19.58	86.38
X_4	84.37	21.90	84.43
C	80.67	24.08	82.23

TABLE 7

MEAN NUMBER OF TRANSFORMED ($\sqrt{X + .5}$) UNIQUE USES IN EXP. II

Cond.	Mean	*SD*
X_1	1.65	.56
X_3	1.35	.58
X_4	1.23	.54
C	1.17	.43

differed significantly from each of the other groups ($P < .001$), whereas these four groups did not differ significantly from each other.

The frequency with which different uses were offered for each item in the Unusual Uses Test was determined from the norms of Exp. I, and an originality score assigned each *S* based on the number of unique responses he submitted. A second score obtained for each *S* was his total number of nonunique or common responses. Since the score distributions for unique responses were skewed, and the variances were heterogeneous, as in the previous study, the transformation $\sqrt{X + .5}$ was applied to them.

Table 7 shows the mean number of transformed unique responses obtained by the various groups receiving the Unusual Uses Test. The variances of the transformed scores were homogeneous as well as the regression of unique responses on the free association pretraining scores. An analysis of covariance of the unique responses regressed on the pretraining scores yielded an F of 10.31 ($df = 3, 207$; $P < .001$). However, since the regression was only .02 no increase in precision over a simple analysis of variance was obtained, and the adjusted means which differ only slightly from the unadjusted means will not be presented.[3] Individual comparisons among the groups by means of t tests showed that the standard experimental training condition, Group X_1, was significantly more original than each of the other conditions ($P < .001$). The other conditions did not differ significantly from each other.

Since the distributions of scores were highly skewed due to the large number of failures to give unique responses, the transformation could not normalize the data. A rank order analysis of variance was therefore conducted. Results comparable to the previous analysis were obtained. The H was 29.82 ($df = 3$; $P < .001$).

Table 8 shows the mean number of common uses obtained by the various groups on the Unusual Uses Test. The variances were homogeneous as well as the regression of common responses on the free association pretraining scores. An analysis of covariance of the common responses regressed on the pretraining scores yielded an F of 5.41 ($df = 3, 207$; $P < .001$). However, since the regression was only $-.02$ no increase in precision over a simple analysis of variance was obtained. Individual comparisons among the conditions by means of t tests showed that the three experimental groups did not differ significantly from each other. However, each of these three groups gave significantly more common responses than the standard control group ($P < .05$).

Results obtained in this experiment for Condition X_1 confirm the results of Exp. I that repeated evocation of different responses to free association stimuli is followed by an increase in the originality of responses to new stimulus words and to items on an Unusual Uses Test as compared to a control group (C) in which such train-

TABLE 8

MEAN NUMBER OF COMMON USES IN EXP. II

Cond.	Mean	*SD*
X_1	20.09	5.17
X_3	19.26	5.91
X_4	21.08	5.63
C	17.03	5.18

[3] The statistical analyses of the results from this experiment were performed on an IBM 650 electronic computer. The results of the analysis of covariance are reported even though they are essentially the same as from an analysis of variance, since the computer program was for covariance, and the computations of the regressions were obtained at the same time.

ing is omitted. Conditions X_3 and X_4 were introduced in order to determine whether the uncommon responses must be evoked by the stimulus words in order for the training to be effective. In the former condition uncommon responses were evoked as textual responses (Skinner, 1957) following the stimulus words, whereas in Condition X_4 only the textual responses occurred. Neither condition was followed by significant increases in originality on the tests employed as compared with Group C, and they obtained significantly lower scores than the standard experimental condition, Group X_1. These results show that with the stimulus materials employed, uncommon responses must be evoked as intraverbal responses by the stimuli if there is to be an increase in originality in the test situations.

It may be argued perhaps that the associations provided Groups X_3 and X_4 are not uncommon. Although this is a possibility it seems rather unlikely, since each association occurred only once in a similar sample of approximately the same number of *Ss*. Furthermore, since a pair of uncommon responses was given for each stimulus word or ordinal position, twice as many uncommon responses were available to Groups X_3 and X_4 than to X_1. Thus, even though some of these associations may have been common to the former groups they still should have received at least as many uncommon associations as *Ss* in Group X_1.

Another hypothesis which may be suggested to account for the difference among the experimental conditions is that the procedure employed with Group X_1 induces the inhibition of common responses as the result of repeated presentations of the same stimulus words and the accompanying instructions, thereby permitting the appearance of uncommon responses. Thus, the facilitation of uncommon responses in the test situations occurs at least in part because of a disposition to inhibit common responses as well as an increase in the excitatory potential of uncommon responses. Conditions X_3 and X_4 do not provide for the inhibition of common responses, but evoke the uncommon responses directly as textual responses.

Evidence apparently contradicting this interpretation stems from another study (Maltzman, Brooks, Bogartz, & Summers, 1958) which found that uncommon uses occurring as textual responses may facilitate performance on the Maier two-string problem. Examination of the latter experiment suggests, however, that the results obtained there are not necessarily in conflict with the inhibition interpretation. In the latter experiment the uncommon textual responses were evoked in the presence of stimulus objects subsequently found in the two-string problem. The excitatory potential of uncommon responses to the test stimuli could therefore be increased by the training procedure employed. But in the present experiments the training and test stimuli were different. This suggests that a training method evoking uncommon intraverbal responses will produce a more general effect than training with uncommon textual responses, and implies further that if uncommon uses for objects not found in the two-string problem were to be employed, facilitation of problem solutions would not occur.

Although Conditions X_3 and X_4 did not show a significant increase in originality in the two test situations, they did yield a significant increase in common responses on the Unusual Uses Test, an effect also obtained in Condition X_1. This finding suggests that uncommon responses, whether textual or intraverbal, tend to facilitate the occurrence of other responses, to facilitate fluency. However, since this result was not anticipated, the experiment was not designed with an adequate control group to determine whether an increase in common uses is peculiar to the evocation of uncommon responses during training or whether such an increase would occur as well if common responses were initially evoked. It should be noted that Condition X_1 in Exp. I did not show a significant increase in common responses as compared to the control group, while highly reliable increases in original responses were obtained. This discrepancy in the results of the two experi-

ments suggests that the present findings of increases in common responses should be accepted with caution. The results of subsequent experiments are equally inconsistent.

Experiment III

The purpose of this experiment was to determine whether Group X_2 in Exp. II failed to show a significant training effect due to the relatively small amount of training it received, five repetitions of the six items from the Unusual Uses Test. In contrast, the standard experimental condition received 25 stimulus items repeated five times. Before it can be concluded that unusual uses items cannot be used as training materials for the facilitation of originality, the effects of more extensive training with these materials must be explored. However, amount of training can be varied in two ways, by increasing the number of items, and by increasing the number of repetitions of the items. Both variations were employed in this experiment.

Method

Subjects. The *Ss* were 162 students drawn from introductory psychology classes.

Stimulus materials. The same initial and final free association lists were employed as in Exp. II. Items from the Unusual Uses Test previously employed were also used in this experiment. Six additional items were used in two of the conditions. These items were, a brick, a pair of scissors, a pencil, a five-cent piece, a light bulb, and a bar of soap.

Procedure. Four different groups of *Ss* were employed similar to Group X_2 in Exp. II. They all received a single presentation of the free association training and test lists. Group A received 10 repetitions of the six items while Group C_1 received 20 repetitions of these items. Group B received five repetitions of 12 items and Group D received 10 repetitions of these 12 items prior to presentation of the free association test.

TABLE 9

Mean Pretest Free Association Originality Scores in Exp. III

Cond.	*N*	Mean	*SD*
A (6 × 10)	43	70.62	30.43
C_1(6 × 20)	38	82.95	21.27
B (12 × 5)	43	78.75	24.10
D (12 × 10)	38	84.71	23.09

TABLE 10

Mean Free Association Test Originality Scores in Exp. III

Cond.	Mean	*SD*
A (6 × 10)	65.39	28.27
B (12 × 5)	68.27	21.23
C_1(6 × 20)	79.17	24.20
D (12 × 10)	77.22	29.32

Results

Performance on the free association training and test lists was analyzed and scored in the same fashion as in the previous experiments. Table 9 shows the mean originality scores obtained by the four groups on the training list. A two-way analysis of variance showed that the column means, 60 vs. 120 responses, differed significantly prior to the introduction of the experimental treatments ($F = 5.21$, $df = 1, 158$; $P < .05$). Factors responsible for this initial bias are not at all apparent. Table 10 shows the unadjusted mean originality scores obtained by the four conditions of this experiment on the free association test list. Appropriate tests showed that the variances of the training and test means were homogeneous. A test of homogeneity of regression of the test scores on training scores, however, was significant ($F = 4.76$; $df = 3, 120$; $P = .01$), thus precluding an analysis of covariance.

Fortunately, however, the assumptions of analysis of covariance were met in the comparison of primary interest.

Comparison of the two conditions in this experiment given six items with 10 and 20 repetitions, conditions A and C_1, respectively, with conditions X_2 and C of the previous study would indicate whether the number of repetitions has a significant facilitating effect upon free association originality. Table 11 presents the adjusted free association test means of these four groups. Their pretraining mean originality scores do not differ significantly. Their

TABLE 11

UNADJUSTED AND ADJUSTED (MEAN') ORIGINALITY TEST SCORES FOLLOWING DIFFERENT AMOUNTS OF TRAINING IN EXPS. II AND III

Cond.	Mean	Mean'
C	80.66	78.81
$X_2(6 \times 5)$	84.36	81.07
A (6 × 10)	65.39	72.03
$C_1(6 \times 20)$	79.17	77.67

variances and regression on pretraining scores likewise were homogeneous. The regression was .66. A simple analysis of covariance gave an F of 1.62 ($df = 3, 169$; $P > .05$). Thus, no evidence of a facilitating effect of training with unusual uses was obtained.

Results obtained with Group X_2 of Exp. II and the four groups of Exp. III indicate that the method of facilitating original responses by repeated evocation of different responses to the same stimuli does not work with all materials.

A basic assumption of the approach employed here is that if original behavior can be induced to occur repeatedly through some training procedure, it will be more likely to occur in new situations. The training method employed, therefore, must evoke many uncommon responses. If this condition is not met, transfer of originality to new stimulus situations cannot occur. It has previously been determined that repeated evocation of different responses to free association materials does lead to increased originality on successive training trials.

The mean percentage of unique uses responses occurring on successive repetitions of the training list was therefore determined for Group A. Fig. 2 shows the results of analyzing the training data, and suggests that a reliable increase in unique responses may have occurred during training. A trend analysis was therefore conducted. It yielded a significant trials effect ($F = 2.60$; $df = 9, 378$; $P = .01$) and Ss' effect ($F = 4.24$; $df = 42, 378$; $P < .001$). Thus, a significant increase in the percentage of unique uses occurred with successive repetitions of the training list. However, a comparison of the effects of training with free association stimulus words and uses, Figs. 1 and 2, indicates that the former produced considerably more unique responses. The mean percentage of unique responses is higher in the former case after a single repetition of the list of 25 words than the latter after 10 repetitions of the 6-item list. This is probably due to the relatively low percentage of unique uses on the first presentation of the unusual uses list. A low operant level would retard the growth of a training effect.

Another possibility is that the kinds of responses evoked by the stimulus items is of critical importance. The free association stimulus materials evoke different discrete responses on each presentation of a stimulus item. In contrast, entire phrases are evoked by the unusual uses items, many of the components of which are common to a large number of the phrases. This would have the effect of reducing the uncommonness of the phrases evoked during training, since many of the component verbal responses occur repeatedly.

In addition, it appears that a relatively limited number of different uses are available for each item. Given the instructions to respond to each repetition of an item and the inability of Ss to do so with a different operant, they respond with essentially synonymous uses repeatedly. It is apparent that considerably more experimental re-

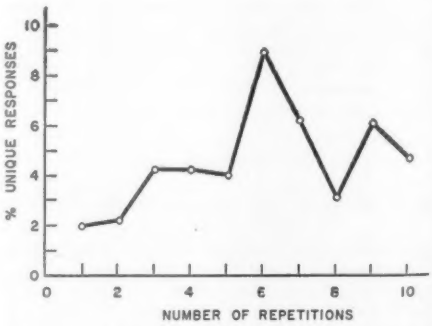

FIG. 2. Mean percentage of unique responses obtained by Group A with unusual uses training in Exp. III.

search is needed in order to adequately determine the training conditions and characteristics of stimulus materials that are necessary to facilitate originality in test situations.

Experiment IV

Condition X_2 in Exp. II indicated that originality training with unusual uses items does not affect performance on the free association test of originality. That is, the experimental procedure previously found to be effective, the evocation of different responses to the same free association stimuli materials, did not have a comparable effect when the stimuli were the names of common objects, and the responses were unusual uses for these objects. Another study, Exp. III, which varied the number of items and the number of repetitions of the items, likewise failed to produce a significant change in the uncommonness of responses on the free association test of originality. It was concluded that repeated presentations of the unusual uses items was ineffective because it did not produce a large enough increase in the uncommonness of the responses evoked during training.

The failure to modify originality test performance by training with unusual uses leaves another important problem unanswered. If, as we have assumed, originality may be learned by the same principles as other forms of operant behavior, it should be a function of the amount of training administered. But since training with the unusual uses items failed to produce any significant effect on test performance, the latter hypothesis could not be adequately studied in the above experiments.

The purpose of the present experiment, therefore, was to determine whether performance on tests of originality would vary as a function of the number of repetitions of the training list. Training was conducted in the free association situation, since reliable effects upon originality have previously been obtained under these conditions. However, in order to increase the generality of the results of this series of studies somewhat, new training and test words were employed as free association stimuli.

Method

Subjects. The *S*s were 201 students drawn from introductory psychology classes.

Stimulus materials. The stimulus words used in the initial training and free association test lists were drawn principally from Woodworth and Wells (1911), and were selected on the basis of their tendency to evoke opposites. This would have the effect of producing a high communality of responses to each stimulus word, i.e., relatively few different responses would be evoked. Table 12 shows the free association training and test words employed. There were 24 words in the training

TABLE 12

Stimulus Words Employed in the Free Association Training and Test Lists in Exp. IV

Training List		Test List
1. yes	13. dirty	1. summer
2. good	14. wrong	2. out
3. east	15. empty	3. above
4. day	16. after	4. north
5. love	17. deep	5. top
6. soft	18. large	6. wet
7. far	19. tall	7. up
8. smooth	20. open	8. long
9. early	21. come	9. big
10. dead	22. male	10. front
11. asleep	23. cold	
12. lost	24. low	

list and 10 in the test list. Guilford's (1950) Unusual Uses Test was administered after completion of the free association test list.

Procedure. The four principal groups were treated in identical fashion on the initial presentation of the free association list, the first 24 stimulus words for these groups. The usual free association instructions employed in earlier experiments of this series were administered. The standard control condition (C) received the test list of 10 new stimulus words following completion of the initial 24-word training list. Since the free association training and test words were selected because they gave a high proportion of opposite responses, it was considered possible that responding to the first 24 stimulus words might induce a tendency to emit opposites on the free association test list. A second control group (C_X) was therefore employed to determine whether this effect would occur. *S*s in this group received only the free association test list, omitting the 24-word training list.

Three different experimental groups received one, five, or ten repetitions of the training list prior to presentation of the free association and Unusual Uses tests. The latter test was employed in a slightly modified form from the standard procedure. The items were presented individually rather than in the usual booklet form with a time limit for each of the two sections of the test. Under the latter conditions *S*s tend to devote a disproportionate amount of time responding to the first item in each section, thereby giving relatively few responses to later items in the test. Presenting the items individually would tend to equate the number of responses given to each item.

Results

Since these training and test words had not been used in the previous experiments, response norms for the stimuli had to be constructed. The frequency with which the different responses occurred to each stimulus word in the training and test lists was therefore determined and *S*s' responses were then scored on the basis of the obtained frequencies.

Table 13 shows the mean originality scores obtained by the various groups on the first presentation of the training list. Homogeneity of variance was indicated by the Hartley test. But a simple analysis of variance indicated that the groups differed significantly prior to the introduction of the experimental treatments ($F = 4.81$; $df = 3, 155$; $P < .005$). The results of t tests indicated that Group X_5 was significantly superior to each of the other groups on the pretest ($P < .05$).

TABLE 13

MEAN PRETEST FREE ASSOCIATION ORIGINALITY SCORES IN EXP. IV

Cond.	*N*	Mean	*SD*
C	44	90.01	23.89
X_1	42	93.68	20.31
X_5	39	73.14	33.54
X_{10}	34	88.14	20.41

Fortunately, the regression of the free association test scores on the pretest scores was considerable, .87. Tests of heterogeneity of regression and homogeneity of variance were not significant, permitting an analysis of covariance in which the originality test scores were adjusted for the initial differences in the training list. Table 14 shows the mean unadjusted and adjusted originality scores obtained by the various groups on the free association test. A simple analysis of covariance was conducted and an F of 20.94 was obtained ($df = 3, 154$; $P < .001$). The results of t tests showed that Groups X_5 and X_{10} did not differ significantly. However, all other differences among the four groups were statistically significant ($P < .01$).

A t test was conducted between Groups C and C_X ($N = 42$; $M = 73.47$; $\sigma = 36.30$) in order to determine whether the emission of opposites on the training words would increase the tendency to give opposites on the test list. If such were the case, Group C would have significantly higher test scores than Group C_X, since opposite responses

TABLE 14

UNADJUSTED AND ADJUSTED (MEAN') FREE ASSOCIATION TEST ORIGINALITY SCORES IN EXP. IV

Cond.	Mean	*SD*	Mean'
C	82.88	28.91	79.60
X_1	68.76	33.95	62.29
X_5	36.03	28.12	47.43
X_{10}	46.03	33.62	44.43

were the most frequently occurring responses to the stimulus words. This was not the case ($t = 1.32$; $df = 84$; $P > .10$).

The frequency of unique responses on the Unusual Uses Test was determined for each S on the basis of the norms for this test derived from Exp. I. A second score obtained for each S was his total number of nonunique or common responses. Since the score distributions for unique responses are skewed, and the variances heterogeneous, the transformation $\sqrt{X + .5}$ was applied to them.

Table 15 shows the mean number of transformed unique responses obtained by the various groups receiving the Unusual Uses Test. Hartley's test indicated that the variances of the transformed scores were homogeneous. Since, as in previous studies, there was no significant correlation between the number of unique or common responses and originality on the free association pretest list, a simple analysis of variance rather than covariance was conducted. The results of the analysis were significant ($F = 5.82$; $df = 3, 155$; $P < .001$). The results of t tests indicated that the three experimental groups did not differ significantly from each other. Each of the three experimental groups gave significantly more unique responses than Group C ($P < .05$ for Group X_5 vs. C, and $P < .001$ for the other two experimental groups vs. Group C).

Table 16 shows the mean number of common responses obtained by the various groups on the Unusual Uses Test. The variances were homogeneous as indicated by the Hartley test. A simple analysis of variance was conducted, yielding a significant result ($F = 4.62$; $df = 3, 158$; $P < .01$). The results of t tests showed that Group X_5 gave significantly more common uses than each of the other two experimental groups ($P < .05$) as well as Group C ($P < .01$). No other differences among the groups were significant.

TABLE 15

MEAN NUMBER OF TRANSFORMED ($\sqrt{X + .5}$) UNIQUE USES IN EXP. IV

Cond.	Mean	*SD*
C	1.01	.45
X_1	1.43	.54
X_5	1.24	.45
X_{10}	1.43	.64

TABLE 16

MEAN NUMBER OF COMMON USES IN EXP. IV

Cond.	Mean	*SD*
C	19.48	5.42
X_1	21.19	5.06
X_5	23.85	6.13
X_{10}	20.94	4.57

Results from the free association test of originality indicate that each of the three experimental groups was more original than the control group. Our analysis, however, cannot indicate the precise nature of the trend produced by varying amounts of training, and the experiment was not designed for this purpose, but only to determine whether or not some form of trend exists. The data obtained show that reliable changes in free association originality may be produced by varying the amount of training in the standard experimental procedure. The particular form of the trend, however, is no doubt a function of the length of the training list as well as the number of its repetitions. Thus, a factorial experiment must be conducted in which both the length of the training list and the number of repetitions are varied before it may be possible to specify the function that obtains between amount of training and originality.

Although all three experimental groups gave significantly more unique responses than Group C, the experimental conditions did not vary as a function of the number of repetitions received. The basis for the absence of a trend among the experimental conditions on the Unusual Uses Test as contrasted with the free association test cannot be determined, and one can only speculate at this point as to why this discrepancy was obtained. A possibility may be the lack of power of the simple analysis of variance as compared with covariance

and/or sampling error in the case of Group X_5. These same factors may also be responsible for the significantly greater number of common uses offered by Group X_5 as compared with the other conditions.

Evidence that performance will vary systematically with the number of repetitions of the training list, even if on only one of the originality tests, lends some further support to the interpretation of originality as a form of learned behavior obeying the principles of operant conditioning.

These results further highlight the failure in Exp. III to obtain any effect upon originality when unusual uses items were employed as the training materials. The fact that a single repetition of a 24-item training list produced a reliable increase in originality on both tests in the present experiment clearly indicates that the failure to obtain an effect in the earlier experiment was not due to an inadequate amount of training.

EXPERIMENT V

If, as we have assumed, originality can be learned according to the principles of instrumental conditioning, then it should show some degree of persistence following training. Since retention is one of the characteristics of learned behavior, the disposition to emit uncommon responses induced by the standard experimental training procedure should also show some degree of permanence. The purpose of the present study was to determine whether this in fact is the case.

Method

Subjects. The *S*s were 177 students drawn from introductory psychology classes.

Stimulus materials. The lists of stimulus words used in the initial free association training and subsequent tests are the same as those employed in the first three studies, and were administered in the same order as in Exp. II. As before, the Unusual Uses Test was administered after the free association test list.

Procedure. All *S*s were presented the initial free association training and final test lists of stimulus words in the same fashion. Two control groups received only a single presentation of the training list. Group C received the free association and Unusual Uses tests approximately one hour later. During the interval of time between the training and test sessions, *S*s were engaged in work on a series of 10 paper and pencil problems. Group C_2 was dismissed following the initial presentation of the free association training list with instructions to return in 48 hours. The free association and Unusual Uses tests were administered at that time. Two experimental conditions, X and X_2, experienced comparable delays between the initial and final test sessions. However, as in previous experiments, they received five additional presentations of the initial free association list with instructions to give a different response than the one used before to each stimulus word.

TABLE 17

MEAN PRETEST FREE ASSOCIATION ORIGINALITY SCORES IN EXP. V

Cond.	N^a	Mean	*SD*
X	62	84.76	22.95
C	58	80.59	26.07
X_2	27	77.46	21.50
C_2	30	79.47	27.93

[a] Due to an unfortunate oversight, approximately half the *S*s in the two-hour delay groups were given a different form of the Unusual Uses Test which had the same frontispiece as the test previously used. We have therefore discarded the free association data from these *S*s as well as their unusual uses.

Results

Table 17 shows the mean originality scores obtained by the various groups on the initial presentation of the training list. A simple analysis of variance indicated that the groups did not differ significantly prior to the introduction of the experimental treatments ($F = .67$). Homogeneity of variance was indicated by the Hartley test.

Table 18 shows the mean originality scores obtained by the various groups on the

TABLE 18

UNADJUSTED AND ADJUSTED (MEAN′) FREE ASSOCIATION TEST ORIGINALITY SCORES IN EXP. V

Cond.	Mean	*SD*	Mean′
X	71.58	26.16	68.77
C	84.47	24.57	84.46
X_2	77.12	23.13	79.20
C_2	87.05	26.05	87.79

free association test of originality. Appropriate statistical tests indicated that the variances of the test scores were homogeneous as well as the regression of test scores on training scores.

Since the training and test scores were correlated significantly, a two-way analysis of covariance was conducted in which the originality test scores were adjusted for initial differences on the training list.

An F of 21.9 ($df = 1, 172$; $P < .001$) was obtained for the originality training effects. An F of 5.58 ($df = 1, 172$; $P < .05$) was obtained for the delay effect.

The frequency with which different uses were offered for each item in the Unusual Uses Test was determined on the basis of the norms from Exp. I, and originality and common response scores obtained as in the previous studies. Since the distributions of scores for unique responses were skewed, and the variances were heterogeneous, the transformation $\sqrt{X + .5}$ was applied to them.

Table 19 shows the mean number of transformed unique responses obtained by the four groups. Hartley's test indicated that the variances of the transformed scores were still somewhat heterogeneous, $P = .05$. As in previous studies, the measures of unique responses and common responses were not correlated significantly with originality on the initial free association list, thereby precluding the use of the analysis of covariance.

A two-way analysis of variance of the transformed unique responses yielded an F of 15.47 ($df = 1, 172$; $P < .001$) for the originality training effect. An insignificant F of 1.10 was obtained for the delay effect.

TABLE 19

MEAN NUMBER OF TRANSFORMED ($\sqrt{X + .5}$) UNIQUE USES IN EXP. V

Cond.	Mean	*SD*
X	1.42	.64
C	1.06	.45
X_2	1.49	.53
C_2	1.21	.57

TABLE 20

MEAN NUMBER OF COMMON USES IN EXP. V

Cond.	Mean	*SD*
X	18.06	4.84
C	18.15	5.24
X_2	17.74	5.37
C_2	15.67	3.97

Table 20 shows the mean number of common responses obtained by the four groups on the Unusual Uses Test. The variances were homogeneous. An F of .77 was obtained for the originality training effect, and 3.32 for the delay effect ($df = 1, 172$, in both cases). Neither effect was statistically significant. The results from the two different tests of originality indicate that highly reliable originality training effects do persist for some time. Thus, some additional support is gained for the interpretation of the training effects as a form of learning. Results from the free association originality test also show a significant delay effect or decrement in originality as the time between the initial and final tests is increased from one hour to two days. This, or course, is another common characteristic of learned behavior.

Results from the Unusual Uses Test showed a highly reliable training effect but not a delay effect. There was no significant decrease in the number of unique responses when the delay was increased from one hour to two days. Again, this discrepancy in the results obtained from the two originality tests may be due to a variety of reasons. It cannot be concluded, however, that a reliable decrement in unique uses did not occur within the time interval studied. Comparison of the delay conditions employed in this experiment with the standard experimental and control conditions of Exp. II, which received the free association lists in the same order, suggests that a decrement occurred within the first hour of delay.

The extent to which the effects of originality training persist, or are retained, is undoubtedly a function of many different variables of the sort that have been studied

in classical experiments on verbal retention. Such variables as amount of practice or original learning, a wide range of delay intervals, activity during the delays, and distribution of practice trials, may all influence the extent to which the effects of originality training persists.

As data accumulate from parametric studies of this sort, and they show that performance on tests of originality vary in a fashion similar to performance in more traditional learning situations, to that extent it may be assumed that the effects of originality training do not differ fundamentally from other forms of learning. The study reported here is an initial attempt in that direction, and lends some support to the hypothesis that originality can be learned in the same fashion as other forms of operant behavior.

CONCLUSIONS

Each of the four experiments employing the standard experimental training procedure with free association materials produced a highly reliable increase in the uncommonness of responses on two different tests. The first two experiments suggest that the standard experimental training procedure of repeatedly evoking different responses to the same stimuli is the most successful of the three experimental procedures employed. It produced significantly greater facilitation of originality on one or both originality tests as compared with the method of evoking different responses by presenting different stimuli as in Exp. I, or evoking uncommon responses as textual responses as in Exp. II. Possible variables responsible for the efficacy of the standard training procedure have already been indicated earlier in this paper and elsewhere (Maltzman, 1960).

The results of Exp. IV and V lend some support to the hypothesis that originality is learned behavior and varies as a function of the same antecedent conditions as other forms of operant behavior. Effects of originality training may persist for as long as two days, under the training and test conditions employed in Exp. V. Originality, at least, on the free association test, also varies as a function of the number of repetitions of the training list.

Although the standard training procedure has proved to be effective, there are many possible variations of the procedure that remain to be investigated. For example, instead of completing the entire training list of stimulus words before re-presenting it, successive responses to each stimulus might be evoked. Various combinations of these procedures may also be studied. Further experimental studies are also needed employing different types of test criteria, including the more traditional kinds of problem situations. Studies of this kind are currently in progress in the UCLA laboratory. Work of this sort may indicate the extent to which the kind of training procedure studied here might have practical applicability. In this connection, it should be noted that the behavior measured on the originality tests employed in these experiments and similar tests correlates reliably with ratings of original behavior (Drevdahl, 1956).

In conclusion, it should be noted that the term "originality" as employed in this paper refers to a particular kind of behavior measured by specified operations under given conditions. If it is objected that this is not genuine originality, then it should be incumbent upon the critic to specify the latter behavior in equally operational terms so that it too may be subjected to experimental study.

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APPENDIX

THE CLASSIFICATION OF RESPONSES ON THE UNUSUAL USES TEST

The list of common and unique uses that follows was initially obtained from the results of Exp. I and was used with minor modifications in the scoring of the Unusual Uses Test from the later experiments. In the initial classification based on the results of Exp. I any use occurring only once in the distribution for all items was designated as unique. Uses occurring more than once were classified as common. Adjustments were made in the initial list by the addition of unique uses when they occurred in the test of a later experiment. On the other hand a unique use was reclassified as common if it occurred more than once on any given subsequent test. Few adjustments of this sort were necessary.

1. AN AUTOMOBILE TIRE (used on the wheel of an automobile)

Common Uses

float
roll
swing
bumper
toy
smoke
chair
obstacle course
jump on
scrap rubber
flower bed (planter)
weight
mending (patch) rubber
weapon (hit someone with, etc.)
decoration (garden, gas station, etc.)
shoe soles
target
advertisement
costume
ride on
inner tube (for swimming)
train dogs
melt and reshape
boat dock (bumper)
wheel on cart
slingshots
start fire (burn)
put in garage
blockade
football practices
insulation
rubber bands
throw things through (football, etc.)
sled
hoop
drum head
supporting another object
sell for living (retail product)
make smell
make sandals
make money
life saving
to swim with
binding to hold tree
horse equipment in horse show
play catch with
draw circles
buoy
tunnel
hold things in lining (hiding place, paper, water, etc.)
to throw
to cut up
make smog
sand box
to break things
hide narcotics
shock absorber

Unique Uses

prop up bigger object
holding hub cap
protect car from bumping paint
protect axle
lawn mower wheels
toss bean bags through
seat at ball game
have on fishing boat
cradle
base for lamp
cover
fort
door mats
anchor down poles
durability demonstration
cable holder
battering ram
padding on walls of amusement park
household rubber material
use in musical chairs
keep rug from slipping
hold air
test coordination
skin diver's net
hold letters or bundles
seat at beach
press papers
pillow
line doors or furniture
store refuse in
bumper cars at beach
bed for animal
hold door open
painter's still life
hold back loose dirt
keep tire salesmen in business
costume for strippers
picture frame
run in to build up legs
soap box racer brake
plug a hole
in a skit
make wall
base for bell-ringing pole at carnival
trade it
inner lining for rubber gun
hang things on
wedge
carve on
make rubber piece for trolling (fishing)
keep repair men busy
roof for stork nest
souvenir
ballast in a boat

in relay games
lift to build muscles
trap
rubber strings for tying wire
hang on tree
clutter up backyard
for color scheme
push things down driveway
make tracks in sand
use in circus act
fill with cement for weight
mold
capture or hold someone
build pyramid to jump off
draw on with chalk
build tree house
sunbaths
texture pieces in art projects
loan to your neighbor
put in a continental kit
hold back flood waters
build with
throw knives
makeshift table
gift
slice and make holders
transfer air to bicycle
sit on while being pulled by speedboat
wagon
to step on when there's mud
to hide behind
chewing gum (Spain)
stick pins in
steal
wheel barrow
in a clock
adjust temperature
on a safe
rubber coverings
support walnut trays above ground
in zoo for monkey to hang on
around a horse in a bull fight
joke
make mudpies in middle of
play tag with
tear up and use as brake on toys
dogs to play with
build fence
end of hammer to pound out dents
keep wood raft afloat
tractors
flatten something
little boy to play army in
burn to prevent frost damage
store unused garden hose
ash tray
bird nest
make an invention
pile up outside of dealers
cause accidents
protective lining for mechanical clamp
bottom of table legs to prevent harming floor

2. A KEY (used to open a lock)

Common Uses

lever (pry things open)
weight
decoration (on chair, etc.)
clean something (fingernail, crack, etc.)
toy
scratch (ear, etc.)
screwdriver
cutter
noise
charm
melt for scrap metal
start car
pry open (jar, can, door, shoe polish, window, etc.)
key to city
scratch (message, desk, wood, paint, etc.)
weapon
symbol (religious, advertisement, etc.)
necklace
bracelet
have (open) diary
put on key ring or chain
give to someone
make new keys
fish lure
start mechanical toy
bookmark
hobby
token
wedge
jingle (to sound like money)
secret identification (password)
rattle
"index" for map, etc.
dig (make) hole
jewelry
hypnotize
tap code
wind clock
short circuit
sorority badge (pin)
tighten skate
make blueprints
use in hop-scotch
look important
to throw
tool
drawing outline
carving
hammer with
pulley for window shade
conductor
treasure in treasure hunt
make designs in sand
magnet
gift
poke hole (in cloth, wood, etc.)
in game of hide and seek
paperweight
clue
wear
souvenir (to hang on wall)
diving and retrieving

Unique Uses

add to junk box
plier
chrome plating
electric shock
having secret
point out something
scrape rust on car chrome
ornament on Christmas tree
symbolize gift of car
signify two people going together
button
hoop pick (for horses)
shoot in slingshot
tap rhythmically
fuse
impress people
studying designs

straighten hairpins
lift small objects
give to baby to chew on
chew on if anxious
to write with
door knocker
award
unfasten screen
school remembrance
scrape
to press
paint it gold
turn on furnace
thermometer on wall
engrave in tree
make print
pad a lock
wrap string around
put on ribbon and tie around neck
to photograph
cut teeth with
press down bump
design on pictures
weight for small animals
impression in clay
evidence in trials
training dogs
toothpick
brace
break something
tap on windows or doors
place marker
play catch with
fiddle with
honorary club
antique
jangle to attract attention
reflect sunlight
suck on
put in valentine
put in scrap book for memory
object for conversation
put safety pin in hole and save
decorate plastic panels
hat
melt into buttons
handle on box
melt and make ring
loosen something
twirl
pick ear with
arouse curiosity

3. A SAFETY PIN (used for fastening)

Common Uses

prick skin
punch hole
open lock
decoration
scratch
weapon
fish lure
remove splinter
pin
toy
toothpick
sticking to bulletin board
put things on map
stick someone
make chains
untie knots
puncture blister
break balloons
remove sliver from skin
decorate sweaters
hold diaper
weights
clean fingernails
open glue tube
punch holes in (cut) paper
carve words
open objects
clean small objects
insert elastic (in sleeve, belt, object)
necklace
pry things open
hold other pins
sewing
tack (something to wall)
picture hanger
marker for hopscotch
jewelry
puncture tire
"pick" (poke) at something
hold dress (skirt) together
hold papers together
pull cord through opening
use as thumb tack
clean small ledges (corners, etc.)
repair zipper
key ring
stick something
retail product
put on button with
pin paper to wall
decoration for hats or dresses (clothes)
kill insect (bug)
get dirt out of ring
engraving (carving)
make wound (sore)
mark stitches in knitting
make wire (scrap)
hang up skirt
hang things on wall
patterns or designs
clothes pin
screwdriver
repair something
scratch name in metal
indicate markers
pick things apart
scratch furniture (or other objects)
stick pin in cushion
hold buttons
letter opener

Unique Uses

connect as belt
base for decorative pin
measure acoustics
make doorbells stick
to keep in pocket
repair hems
scrap metal
cork opener
make link in S. P. bracelet
demonstrate magnate
make fine lines in drawing
hook for lanyard
squeezer
decoration for food
string tokens on
hold glasses together
prop
poke things that are wedged in places
string pearls
pull string through narrow opening
hold message on door
keep window shade up

mark spot on treasure hunt
wire joiner
pierced earrings
prick babies
to impair clothes washer mechanism
hold up falling objects
determine who has next baby at shower
pinpoint object
cause pants to fall down
poison dart
carry in purse
get money out of piggy bank
clean top of salt shaker
bend into party favor
widen small hole
play "pin the tail on the donkey"
phonograph needle
puncture leather
collar clip
pick off fingernail polish
bracelet
Christmas tree decoration
belt
pinch somebody
bend around something
use as nail
torture flies
stick in a flower
make small noise
running elastic
clean pipe
on back of sign
clean comb
make scatter pin
make up weight
terms of barter
make cardboard filter
reshape
tear material
remove thread
stopper holes
mechanical purposes
separate stitches in knitting
dig hole
stick butterfly on it
play poker with

4. A WATCH (used for telling time)

Common Uses

decoration
toy
demonstrate mechanics
(paper) weight
tell direction
hear (listen to tick)
pawn (sell)
prize
hypnotize
rhythm
bracelet
for experiments
impress people
draw circles
timing events
take apart and fix
jewelry
gold content
picture holder
used by watchmakers (to make living from)
cover scars on wrist
suspend fobs on
gift
art pieces
tell date
time pulse
to wear
wealth object
showmanship (show off)
learn to be jeweler
take apart and study parts
test hearing
time tests
teach how to tell time
time bomb (prank)
bribe object
to start conversation with
to keep a date (appointment)
timing device for bombs
use as pin
set off alarm
put cheat notes in
teach to count (numbers)
check resistance to water
noise to keep someone awake
advertising
throw at someone
metronome
to sell
tell weather
(hang from) chain
ticking sound to put to sleep
smuggle (conceal) (jewels)
collect as hobby
family heirloom
souvenir
to listen to
to annoy somebody
strap things together
ticking to soothe puppy
noise from ticking
comfort a (motherless) cat
looks
loan to magician who pretends (tricks) to break it.

Unique Uses

melt parts for metal
money
learn clockwise vs. counter-clockwise
make dent in arm
reading meters
glass for cutting
irritate person
silver content
reassemble gears for other purpose
provide employment
security for loan
fiddle with when nervous
hang on string and find vertical
use chain to latch door
use parts—paraffin for wrapping paper
speedometers
to steal
glass for magnifying
check resistance to shock
exercise fingers
test sight
home appliance
guessing lengths of time
mechanics to fool with
lure to catch thief
swing in self-defense
knuckle guards in fight
to expand industry
forecast future
symbol
clean fingernail with stem
training item in school

projectile for throwing
investment
window displays
reward
split apart for modern abstraction
mantelpiece
tinkering
wrist warmer
source of frustration when not running
starting signal
pounding something
vent destructive instincts on it
back as mirror
hold something on wrist
get spare parts
open something
teach someone how to make one
weight measure
parts to decorate fish bowl
squash ants
sound effect in movie
keeps jewelers happy
hide birthmark
threatening someone
practice in amplifying sound
turn on lights
turn on pump
hide stolen article
puzzle
remembrance
give seasons
symmetrically suspended center piece
chocolate candy formed as watch
sound vibration experiment
used to tell when you are near magnet
break and use parts for confetti
practice putting things together
reassure baby chicks
weight on tie to keep it in place
guard a vault
hang medal from
wear around neck to hold collar in place
play passing game
decorate with parts in plastic panels
take out springs and bounce them around
buy bands for
spend money fixing
in place of grandfather clock
take hands off and use in another watch
drop from high distance to test breakage

5. A BUTTON (used to fasten things)

Common Uses

decoration (shoes, handbags, etc.)
toy (play game)
play money
draw circle
necklace
earrings
poker chips (gambling)
means of exchange
make objects (picture, etc.)
stop up sink
hobby
teach how to count
practice sewing
to throw (at people)
lucky pieces
badge (emblem)
checkers
bingo
make rattles
noses for dolls, etc.
make designs (patterns, etc.)
sell for money
make eyes (on dolls, on animals, snowmen, etc.)
learn colors from
slug
small target
to suck (chew) on
monocle
trade object
bracelet
teach children to fasten things (dress themselves)
make noise (with many)
play with when nervous
make jewelry
fill button (sewing) box
"ivy league look"
hide tear or spot (on dress)
hide a hole (in wall, etc.)
in counters
put string through it (bends, etc.)
hold something together
advertise for office in election

Unique Uses

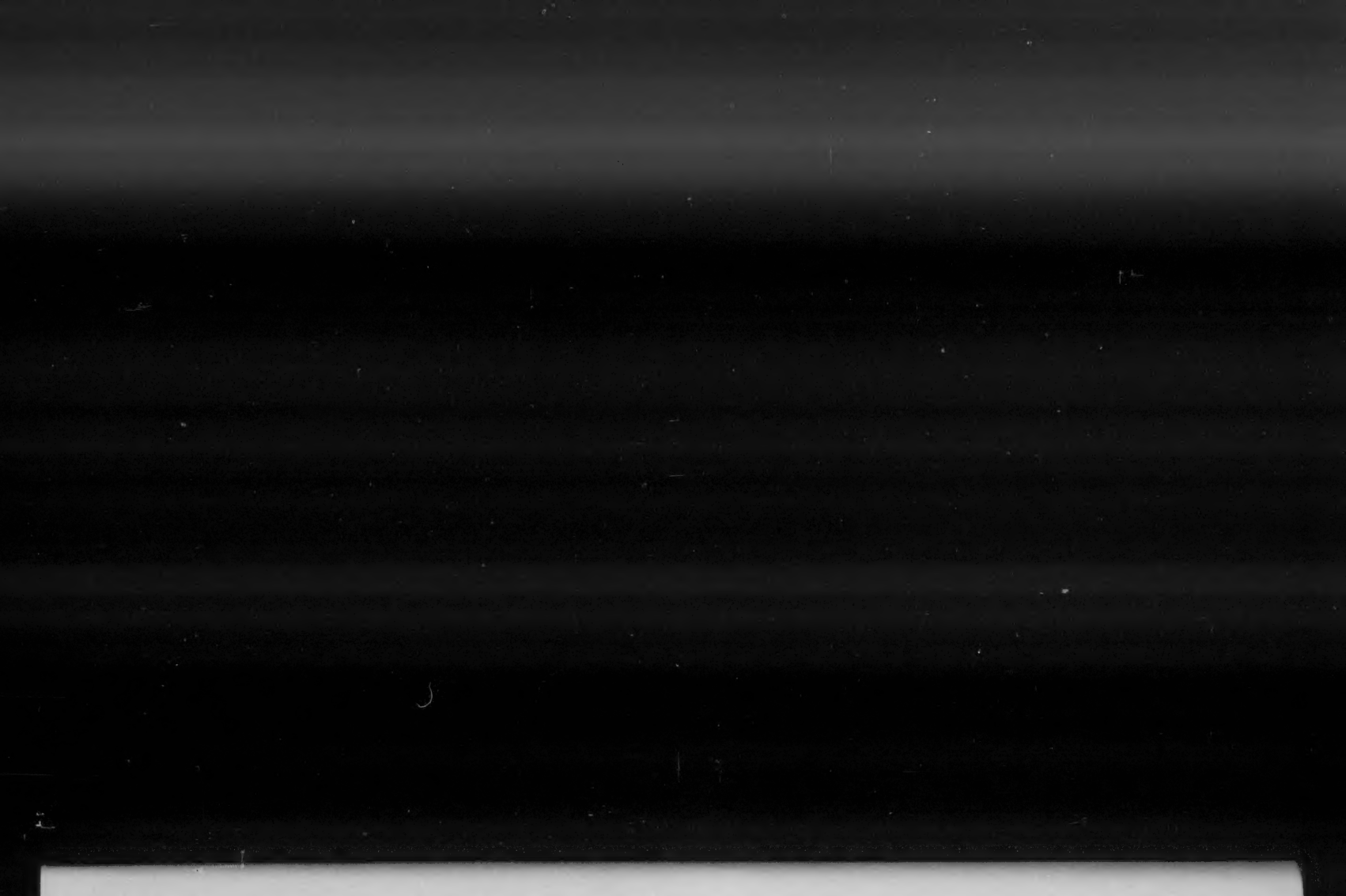
pry open cans, jars, etc.
to roll
souvenirs
paperweight
color board
for beauty or looks
swing from swing to scare flies
pressure object to stop bleeding
golf marker
article in visual demonstration
map marker
to paint
stuff chair
pin
construct pendulum
to flip as coin
put texture on paintings
use up thread
demonstrate durability
signal
teething for babies
weight
hold name tag
stop swelling of bump
Christmas tree decoration
separate papers (wedge, etc.)
prize
historical value
teach handicapped children self-help
sift bread crumbs through holes
stuff dolls
make faces with
shimmy
stuff bean bag
mark of crosswalk
word in word assimilation
tests
memories of clothes
for art projects
hang from string to see where wind blows
outline pictures
clue
swallow to get sick

put in fish pond
evidence in a trial
in educational books for children
trip someone
build houses
end of string attached to light
play catch with
knob on radio
token of appreciation
put in muffins for raisins
fingernails on snowman
remembrance
put in goulash for joke
throw in shallow pond for color
outlet for creative design
nervous fingers to fidget with
fishing plug
wheels of a car
show authority
to trip on
designate political party
button box for invalids
make clip for hair
make knob on lid
eyes in gingerbread cookies
pledge girlfriend with
hold the car door in place
causes embarrassment when they fall off
toy soldiers
put on string for cat to play with
make pools in a lake

6. EYEGLASSES (used to improve vision)

Common Uses

change appearance (looks)
protect eyes (from glares, sparks, etc.)
magnify
disguise (hide behind, etc.)
acting (plays)
cutting
keep out of fights
toy
decoration
hearing aids
keep out sun
look intelligent (professional, etc.)
for reading (studying, etc.)
start fires
prop
masquerade costume
comedy
when you want to break something (release emotions)
make eyes look larger (or smaller)
put into a case
sophistication (look distinguished)
look distinctive or old
telescope (binoculars, etc.)
microscope
mirror
gesture object
worsen vision
give false impression (impersonations)
hurt looks
place on head to hold hair down
protect eyes from smog (dust, etc.)
relieve headaches
fashion mode
art object
"gag gift"
hide black eye
rest eyes
lenses for experiment
paperweight
weapon
jewelry
chew on ends (during exams, etc.)
impress people
for amusement
carry in purse

Unique Uses

shield metal particles
pane for peephole
doll house window
bottle caps
put pencil in
tap to be annoying
give self-confidence
as fad
test vision
look at atom test
crush glass and use as dog poison
spend parents' money
decorate with shells
attract attention
learn to use radius of curvature
give people complex
scare away men
give to charity
sun reflector to send signals
hold false nose on
frame for spare wire
add color
spend money foolishly
hang on statues
to finger when nervous
excuse for not obeying signs
design frame for
construct them
melt down glass for better use
scratch head with rims
draw circle
melt and analyze composition
rinse the eyes
replace human eye
book mark
conversation piece
reach object that has fallen in narrow hole
advertising
cut oneself
make living from
depict certain personality
to break and cost money
hide hangover